

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for courtesies extended during the Examiner Interview of February 8, 2005.

Disposition of Claims

Claims 1-13 are pending in this application. Claim 12 has been canceled by this reply. Thus, claims 1-11, and 13 are now pending in this application. Claims 1, 6, and 13 are independent. The remaining claims depend, directly or indirectly, from claims 1 and 6.

Information Disclosure Statement

Applicant respectfully requests the Examiner to initial next to the entry labeled "Combined Search and Examination Report; July 17, 2003" under the heading "OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS" in the PTO-1449 Form filed on August 23, 2003.

Claim Amendments

Independent claims 1, 6, and 13 have been amended to include the limitation "wherein the minimal set of updates is the smallest possible set of updates necessary to synchronize the consumer server with the supplier server." As discussed with the Examiner during the Examiner Interview of February 8, 2005, the independent claims have been amended to more clearly recite the definition of a "minimal set" of updates as the smallest set of updates required to synchronize two servers. Support for this amendment may be found, for example, on page 9, paragraph 32 of the specification. Further, claim 1 has been amended to clarify that the step of "determining" a minimal set of updates involves performing analysis, such as comparing one update replica vector to another replica update vector to determine discrepancies between the two vectors. Support for this amendment may be found, for example, on page 10, paragraph 35 of the specification. No new matter is added by way of these amendments.

Rejections under 35 U.S.C. § 103

Claims 1, 2, and 4 stand rejection under 35 U.S.C. 103(a) as being unpatentable over “The LDUP Replication Update Protocol” by Stokes, et al. (“Stokes”) and U.S. Patent No. 6,272,536 (“van Hoff”). Claim 1 has been amended to clarify the present invention recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

The present invention involves the use of Replica Update Vectors (RUVs) in a directory server. A replica is a locally-held copy of a portion of a directory information tree (DIT) (*See* Specification, page 9, paragraph 32). Specifically, the RUV is used to determine the minimal set of updates to bring a consumer server up-to-date with respect to a supplier server. A minimal set of updates is the smallest possible set of updates required to bring the consumer server up-to-date with the supplier server. In one embodiment of the invention, in order to determine the minimal set of updates, a supplier server requests the RUV information from a consumer server. The consumer server subsequently sends the RUV information to the supplier server where a comparison of the RUVs is made to determine whether a difference exists. If there is a difference, the supplier sends the differences as an update to the consumer’s RUV. Thus, the difference between the compared RUVs is used to determine the minimal set of updates (*See* Specification Figure 7 and page 10, paragraph 35). Therefore, amended claim 1 requires, in part, performing a comparison to determine a minimal set of updates necessary to synchronize the consumer server with the supplier server, wherein the minimal set of updates is the smallest possible set of updates necessary to synchronize the consumer server with the supplier server.

With respect to the rejection of the claims, the Examiner admits that Stokes fails to teach or suggest “determining of a minimal set of updates” on page 3 of the Office Action mailed January 27, 2005, and relies on van Hoff to disclose this limitation. However, van Hoff fails to disclose or suggest performing a comparison to determine a minimal set of updates, as required by amended independent claim 1. Specifically, the Examiner cites column 8, lines 35-38 and col. 4, lines 48-52 of van Hoff in asserting that van Hoff discloses this limitation of claim 1. However, the cited portions of van Hoff disclose an optimized update vector that is “a lot smaller” than the original update vector due to the replacement of a channel index with the checksum of the channel index. An update vector that may be smaller than another update vector due to replacement of a field in the vector is not the same as a *minimal set* of updates

because a smaller vector may be smaller by any arbitrary amount, whereas a minimal set is defined as the smallest possible set of updates.

Further, as described above, two RUVs are compared to determine discrepancies, which results in the minimal set of updates required. On the other hand, van Hoff fails to disclose or suggest determining a *minimal set*, and thus, necessarily cannot disclose or suggest performing a comparison of RUVs to determine the minimal set of updates required to synchronize two servers.

In view of the above, it is clear that Stokes and van Hoff, whether considered separately or in combination, fail to render amended independent claim 1 as obvious. Dependent claims 2 and 4 are patentable over Stokes and van Hoff for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 3 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes and van Hoff, and further in view of U.S. Patent No. 6,353,834 (“Wong”). Claim 1 has been amended to clarify the present invention as recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

As discussed above, both Stokes and van Hoff fail to render amended independent claim 1 obvious. Further, Wong fails to supply that which Stokes and van Hoff lack. Specifically, Wong at least fails to disclose or suggest determining a minimal set of updates by performing a comparison. Instead, Wong discloses a message queuing system that saves and stores messages and their state in an efficient single file on a single disk to enable rapid recovery from server failures (*See* Wong, Abstract). Thus, all writes are contained in one sweeping motion of the write head in which the write head moves only in one direction and only once to find the area where it needs to start writing messages and their states are stored. Wong is completely unrelated to finding and updating discrepancies between two servers to keep data contained in the two servers consistent. Thus, like Stokes and van Hoff, Wong fails to disclose or suggest at least determining a minimal set of updates by comparing two RUVs, where the minimal set of updates is the smallest possible set of updates necessary to synchronize two servers.

In view of the above, it is clear that Stokes, van Hoff, and Wong, whether considered separately or in combination, fail to render amended independent claim 1 obvious. Dependent

claim 3 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes and van Hoff, and further in view of U.S. Patent No. 6,393,434 (“Huang”). Claim 1 has been amended to clarify the present invention as recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

As discussed above, both Stokes and van Hoff fail to render amended independent claim 1 obvious. Further, Huang fails to supply that which Stokes and van Hoff lack. Specifically, Huang fails to disclose or suggest at least determining a minimal set of updates by performing a comparison. Huang discloses a method and system for performing synchronization between a first replica associated with an application in a first computer processing device and a second replica associated with the application in a second computer processing device (*See* Huang, Abstract). A synchronization plan is generated to perform the synchronization, which includes data structure information corresponding to data structures of the replicas, storage access information for enabling access to each individual data unit within the data structures of the replicas, and synchronization and conflict resolution actions for specifying actions to be taken for each individual data unit with respect to the synchronization. Huang is completely silent with respect to determining a minimal set of updates, where the minimal set of updates is the smallest possible set of updates necessary to synchronize two servers. Further, Huang fails to disclose or suggest comparing two RUVs to determine a minimal set of updates.

In view of the above, it is clear that Stokes, van Hoff, and Huang, whether considered separately or in combination, fail to render amended independent claim 1 obvious. Dependent claim 5 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 6, 7, 10, 12, and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes and U.S. Patent No. 6,098,078 (“Gehani”). Independent claim 12 has been canceled by this reply. Thus, this rejection is now moot with respect to claim 12. Independent claims 6 and 13 have been amended to clarify the present invention as recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

With respect to claim 6, the Examiner admits that Stokes fails to disclose or suggest “comparing the replicate update vector.” Further, as discussed above, Stokes fails to disclose or suggest “...obtain a minimal set of updates, wherein the minimal set of updates is the smallest possible set of updates necessary to synchronize the consumer server with the supplier server.” Additionally, because the Examiner admitted that Stokes fails to disclose “...sending the discrepancies of a comparison,” it is not possible for Stokes to disclose “sending the minimal set of updates.”

Further, Gehani fails to supply that which Stokes lacks. Specifically, Gehani relates to maintaining consistency of database replicas using version vectors to determine whether updates are necessary. However, Gehani fails to disclose or suggest at least determining of a minimal set of updates, where the minimal set of updates is the smallest possible set of updates necessary to synchronize two servers. Instead, Gehani periodically compares version vectors of pairs of data item replicas and brings the older replica up-to-date if the version vectors are not identical (*See* Gehani, col. 8, ll. 51-55). The method of Gehani is completely silent with respect to determining a minimal set of updates needed to synchronize a consumer server with respect to a supplier server.

Additionally, the Examiner asserts that Gehani teaches “requesting a replica update vector,” and references column 14, lines 11-14 of Gehani. However, the cited portion of Gehani is completely unrelated to requesting an RUV. Instead, Gehani discloses receiving an out-of-bound request. An out-of-bound request represents data items obtained by *direct copying*, outside the normal update propagation procedure of Gehani (col. 14, ll. 7-10), whereas a replica update vector contains the state of a replica of information in a directory server with respect to other replicas. Specifically, Gehani discloses

“While it is not feasible to provide different schedules for each data item in the database, the ability to reduce the update propagation time for some key data items is important. Thus, we must allow nodes to obtain a newer version of a particular data item at any time, in addition to normally scheduled update propagation. We call these data items, **obtained by direct copying** outside the normal update propagation procedure, out-of-bound data items.” (Gehani, col. 4, ll. 38-46) (Emphasis added)

Thus, the whole point of requesting an out-of-bound request is to provide an alternative to update propagation via comparison of version vectors. Therefore, it is impossible for the requesting of an out-of-bound request to be equivalent to requesting an RUV.

In view of the above, it is clear that Gehani fails to disclose or suggest the above limitations that Stokes lacks. Thus, amended independent claim 6 is patentable over Stokes and Gehani, whether considered separately or in combination. Further, dependent claims 7 and 10 are patentable for at least the same reasons. Independent claim 13 has also been amended to include similar allowable subject matter. Thus, claim 13 is also patentable over Stokes and Gehani for at least the same reasons as independent claim 6. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 8 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes and Gehani, and further in view of van Hoff. Independent claim 6 has been amended to clarify the present invention as recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

As discussed above, Stokes, Gehani, and van Hoff all fail to render the amended independent claims obvious. Specifically, Stokes, Gehani, and van Hoff fail to disclose or suggest at least determining a minimal set of updates, where the minimal set of updates is the smallest possible set of updates necessary to synchronize two servers. In view of the above, it is clear that amended independent claim 6 is patentable over Stokes, Gehani and van Hoff. Dependent claim 8 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 9 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes and Gehani, and further in view of Wong. Independent claim 6 has been amended to clarify the present invention as recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

As discussed above, Stokes, Gehani, and Wong all fail to render the amended independent claims obvious. Specifically, Stokes, Gehani, and Wong fail to disclose or suggest at least determining a minimal set of updates, where the minimal set of updates is the smallest possible set of updates necessary to synchronize two servers. In view of the above, it is clear that

amended independent claim 6 is patentable over Stokes, Gehani and Wong. Dependent claim 9 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 11 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Stokes and Gehani, and further in view of Huang. Independent claim 6 has been amended to clarify the present invention as recited. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.


As discussed above, Stokes, Gehani, and Huang all fail to render the amended independent claims obvious. Specifically, Stokes, Gehani, and Huang fail to disclose or suggest at least determining a minimal set of updates, where the minimal set of updates is the smallest possible set of updates necessary to synchronize two servers. In view of the above, it is clear that amended independent claim 6 is patentable over Stokes, Gehani and Huang. Dependent claim 9 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 13220/013001; P5848).

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Respectfully submitted,

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